Game Changing Development

Advanced Near Net Shape Technology (ANNST)

Completed Technology Project (2012 - 2016)

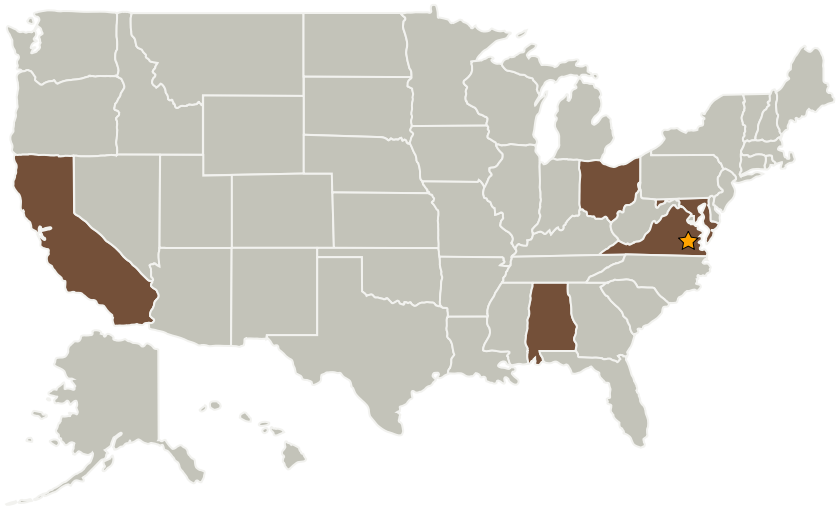
Project Introduction

Develop and mature manufacturing technology to enable fabrication of single-piece integrally-stiffened launch vehicle structures to replace expensive, heavy, and risky multi-piece welded assemblies. Status: Have demonstrated fabrication of subscale single-piece cylinders with integrally formed cryogenic tank barrel scale stiffeners using the Integrally Stiffened Cylinder (ISC) process. Developing strategy for scale up with intermediate scale application on Sounding Rockets.

Anticipated Benefits

Develop and mature manufacturing technology to enable fabrication of single-piece integrally-stiffened launch vehicle structures to replace expensive, heavy, and risky multi-piece welded assemblies.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia

Scale-up and process modifications achieve taller stiffeners.

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Primary U.S. Work Locations	
Alabama	California
Maryland	Ohio
Virginia	

Project Transitions

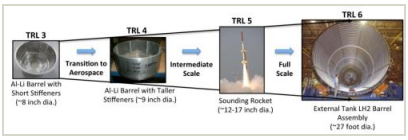
October 2012: Project Start

September 2016: Closed out

Closeout Summary: ANNST flew on a suborbital flight in October 2015.

Images

ANNST
Scale-up and process modifications achieve taller stiffeners. *(https://techport.nasa.gov/image/143206)*



ANNST TRL progression
TRL maturation approach for the Integrally Stiffened Cylinder (ISC) process. Intermediate scale-up for Sounding Rocket demonstration. Long term goal to pursue large-scale cryogenic tank structures. *(https://techport.nasa.gov/image/143222)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Center / Facility:
Langley Research Center (LaRC)

Responsible Program:
Game Changing Development

Project Management

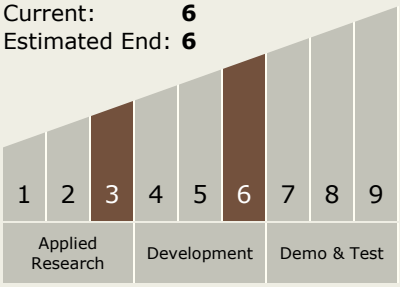
Program Director:
Mary J Werkheiser

Program Manager:
Gary F Meyering

Principal Investigator:
John H Vickers

Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



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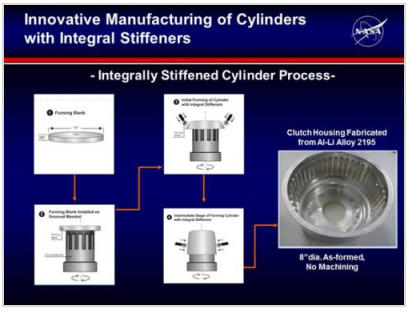

Schematic of the Integrally Stiffened Cylinder (ISC)
Schematic of the Integrally Stiffened Cylinder (ISC) process and image of the first successful fabrication of a clutch housing using Al-Li alloy 2195. *(https://techport.nasa.gov/image/143232)*

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Target Destination

Earth